

CLAIMS

What is claimed is:

1. A laser transmitter, comprising:
 - an input stage receiving a first signal and generating a second signal with a steady voltage swing in response to the first signal;
 - a control circuit generating a control signal;
 - a limiting amplifier having:
 - an input terminal receiving the second signal;
 - a control terminal receiving the control signal; and
 - an output terminal outputting a third signal having (a) an improved rise and fall time over the second signal and (b) an amplitude characteristic prescribed by the control signal;
 - a laser driver receiving the third signal and generating a fourth signal in response to the third signal; and
 - a light source receiving the fourth signal and generating a light in response to the fourth signal.
2. The laser transmitter of claim 1, wherein the control signal sets a common-mode of the third signal.
3. The laser transmitter of claim 1, wherein the control signal sets a peak amplitude of the third signal.
4. The laser transmitter of claim 1, wherein the control circuit comprises a register storing and outputting a digital control signal to the limiting amplifier.
5. The laser transmitter of claim 4, wherein the limiting amplifier comprises:
 - a first variable resistor having an input terminal coupled to a rail;
 - a second variable resistor having an input terminal coupled to an output terminal of the first variable resistor;
 - a third variable resistor having an input terminal coupled to the output terminal of the first variable resistor;

a differential pair comprising:

a first bipolar transistor having:

a collector coupled to an output terminal of the second variable resistor;

a base coupled to receive the second signal;

a second bipolar transistor having:

a collector coupled to an output terminal of the third variable resistor;

a current source having:

an input terminal coupled to the collector of the first bipolar transistor;
and

an output terminal outputting the third signal.

6. The laser transmitter of claim 5, wherein at least one of the first, the second, and the third variable resistors has a control terminal coupled to the digital control signal.

7. The laser transmitter of claim 6, wherein at least one of the first, the second, and the third variable resistors comprises a voltage controlled resistor.

8. The laser transmitter of claim 5, further comprising:

a programmable current source having an input terminal coupled to emitters of the first and the second bipolar transistors;

wherein at least one of the first, the second, and the third variable resistors and the programmable current source has a control terminal coupled to receive the digital control signal.

9. The laser transmitter of claim 1, wherein the control circuit comprises:

a register storing a digital control signal;

a digital-to-analog converter (DAC) receiving the digital control signal and generating an analog control signal to the limiting amplifier.

10. The laser transmitter of claim 9, wherein the limiting amplifier comprises:

a first variable resistor having an input terminal coupled to a rail;

- a second variable resistor having an input terminal coupled to an output terminal of the first variable resistor;
- a third variable resistor having an input terminal coupled to the output terminal of the first variable resistor;
- a differential pair comprising:
 - a first bipolar transistor having:
 - a collector coupled to an output terminal of the second variable resistor;
 - a base coupled to receive the second signal;
 - a second bipolar transistor having:
 - a collector coupled to an output terminal of the third variable resistor;
- a current source having:
 - an input terminal coupled to the collector of the first bipolar transistor;
 - and
 - an output terminal outputting the third signal.

11. The laser transmitter of claim 10, wherein at least one of the first, the second, and the third variable resistors has a control terminal coupled to the analog control signal.
12. The laser transmitter of claim 11, wherein at least one of the first, the second, and the third variable resistors comprises a voltage controlled resistor.
13. The laser transmitter of claim 10, further comprising:
 - a programmable current source having an input terminal coupled to emitters of the first and the second bipolar transistors;
 - wherein at least one of the first, the second, and the third variable resistors and the programmable current source has a control terminal coupled to receive the analog control signal.
14. A method for calibrating a laser transmitter, comprising:
 - (a) detecting an eye diagram of an output from the laser transmitter;

- (b) determining if the eye diagram is acceptable;
 - (c) if the eye diagram is not acceptable, changing a value of a control signal in the laser transmitter, wherein the control signal sets an amplitude characteristic of an limiting amplifier coupled to a laser driver in the laser transmitter; and
 - (d) repeating steps (a), (b), and (c) until the eye diagram is acceptable.
15. The method of claim 14, wherein the control signal sets a common-mode of the limiting amplifier.
16. The method of claim 14, wherein the control signal sets a peak amplitude of the limiting amplifier.
17. The method of claim 14, wherein said detecting an eye diagram comprises:
- coupling the output of the laser transmitter to an oscilloscope, wherein the oscilloscope generates an eye mask margin; and
 - downloading the eye mask margin from the oscilloscope to a computer.
18. The method of claim 17, wherein said determining if the eye diagram is acceptable comprises:
- using the computer to determine if the eye mask margin has reached an acceptable value.
19. The method of claim 14, wherein said changing a value of a control signal comprises:
- at least one of incrementing and decrementing the value of the control signal.